Benchmarks

Add to intro:

Fps,

The following benchmarks were made on the most popular games played. For the benchmark, the frames per second (FPS) will be the main value compared, were higher is better. The lists of games assessed are the following on high settings at 1080p:

Relevant Games (Statistics) (Fortnite, Valorant, Rocket League, CS, League of Legends, Cyberbunk, Minecraft, WoW, CIV 6, GTA V, Crysis, Skyrim, Warzone, MW2 2022)

Computer Benchmarks

Cinebench 23: 1593 Single Core  
 11201 Multi Core

<https://www.youtube.com/watch?v=rzX_hkjE2fw>

<https://www.youtube.com/watch?v=4ipFbzI5NsM>

<https://www.youtube.com/watch?v=Erx4fhJkA_g>

3D Mark is for GPU test mostly(basically gauging performance)

* Fortnite – 111fps 51fps
* Valorant – 349fps | 146fps
* Rocket League – 361fps 181fps
* Counter Strike: Global Offensive (CSGO) – 283fps 146fps
* League of Legends (LoL)
* Cyberbunk 2077 – 60fps 46fps
* Minecraft
* World of Warcraft (WoW)
* Civilization VI (CIV 6)
* Grand Theft Auto V (GTA V) – 121fps
* Crysis 3 – 51fps 31fps
* The Elder Scrolls V: Skyrim
* Call of Duty Warzone – 104 fps 74 fps
* Call of Duty Modern Warfare (2020) – 121fps 72fps
* Call of Duty Modern Warfare 2 (2022)

Productivity benchmark

Although the PC is mainly used for gaming, the productivity benchmark gives it a good basis to compare to other components i

n its price range

Cinebench R23 scores

Comparison to other popular CPUs within price range:

Although the PC is mainly used for gaming, the productivity benchmark gives it a good basis to compare to other components. With the benchmark test Cinebench R23, we compared our choice of Ryzen 5 5600X to other CPUs in its price range (Figure: Cinebench R23 Scores). We found that the Ryzen 5 5600X was a good choice for its price to performance capabilities.

<https://nanoreview.net/en/cpu-list/cinebench-scores>

|  |  |  |
| --- | --- | --- |
| 1536 | 11697 |  |

[Ryzen 7 5700X](https://cpu.userbenchmark.com/SpeedTest/1823386/AMD-Ryzen-7-5700X-8-Core-Processor) $267.99- 1496 13926

[Ryzen 5 5600](https://cpu.userbenchmark.com/SpeedTest/1822932/AMD-Ryzen-5-5600-6-Core-Processor) $174.99-

|  |  |
| --- | --- |
| 1488 | 10523 |

I5 – 12400 $271.98

|  |  |
| --- | --- |
| 1705 | 11853 |

[Core i5-11400](https://cpu.userbenchmark.com/Intel-Core-i5-11400/Rating/4112) [**$274**](https://cpu.userbenchmark.com/Intel-Core-i5-11400/Rating/4112#Prices)

|  |  |
| --- | --- |
| 1335 | 9488 |

[Core i5-10400F](https://cpu.userbenchmark.com/Intel-Core-i5-10400F/Rating/4079) $236.45

|  |  |
| --- | --- |
| 1120 | 7573 |
|  |  |

<https://www.videocardbenchmark.net/gpu_list.php>

7

RX 6600-XT - $330 16087

GeForce RTX 3050 8GB $399.99- 12709

GeForce GTX 1660 Super $338.98 – 12767

Radeon RX 6650 XT $433.45 – 17648

RX 6500-XT $259.99 – 9305

Like the CPU benchmark, the productivity test for the GPU gives a good basis for the GPU. The GPUs assessed were close in price to RX 6600-XT chipset. With the benchmark test Passmark G3D Mark each chipset is given an average score.

 Business Communications 1116 COMM

**An Analyzed Hardware Recommendation**

Department of Computing, British Columbia Institute of Technology



**Summary**

Our organization the PC Master Race Benevolent Gaming Society’s goal is to provide financially struggling students with better computers, so they are able to play any video game to their liking. By comparing and contrasting potential computer components we found the best performing combination of computer components in the current market below $1,800 after tax.

To find the best hardware components, We have compared them based on their performance in certain benchmarks. For the CPU, we used scores from the Cinebench R23 Benchmark. Similar evaluation was done on the GPU, using scores from the Passmark G3D Benchmark.

We formed two different builds, one with an AMD Ryzen 5 5600X CPU, the other with an Intel i5-12400 CPU, both with the same Radeon RX 6600-XT GPU and eventually settled with the AMD Ryzen 5 5600X build.

**Introduction**

Gaming computers have been increasing in price every year and video games are starting to require higher specs than your average home desktop. “A typical gaming PC will cost you between $800 and $1,200. However, if you want to run high-end games, with a 60+ frame rate on max settings, you may need to pay as much as $2,000” (Locknear, n.d.). Our organization is targeting students who are in post-secondary trying to use gaming as an escape from their stressful school life. Many of these students are struggling financially and are unable to work full-time due to a busy schedule. We wish to provide these students with gaming computers as well as a chance to learn about computers so they are able to play video games without having the stress of them breaking down or not having the required specs. With these gaming PCs, we allow students to have an enjoyable break from their school life, while also being able to use these powerful computers for their school needs as well.

**Criteria**

**Games**

The Basis behind which we chose our Gaming computer build was what games we believe students would play. Utilizing popular games in North America as our benchmark can give us an estimation as to which games our students will use the computer for. In Figure 1.1 we showcase the most popular games and their estimated player count in the thousands.

Chart, bar chart, histogram

Description automatically generated

(All data information was sourced from steamcharts.com, activeplayer.io, and playercounter.com)

Our priority for these students was game accessibility, and our builds will allow every student to run each and every one of these popular games for this generation, as well as upkeep standards for pc gaming within the next few years.

**Benchmarks**

**CPU**

The focus of the benchmarks will be done on the CPU and GPU as they are the main determinant for the performance of a PC. Although the PC is mainly used for gaming, the productivity benchmark gives it a good basis to compare to other components. With the benchmark test Cinebench R23, we compared CPUs in a price range that would fit our $1,800 budget (Figure: Cinebench R23 Scores).

Chart, bar chart

Description automatically generated

**GPU**

Similar to the CPU benchmark, the productivity test for the GPU gives a strong basis for the GPU. The GPUs we assessed were similar in price to the chipset (*Video Card Benchmarks*, 2022). With the benchmark test Passmark G3D Mark each chipset is given an average score (Figure: Passmark G3D Mark Scores).

Chart, bar chart

Description automatically generated

**Evaluation**

**Two Options**

We found that the Ryzen 5 5600X was an excellent choice for its price to performance capabilities (NanoReview.net, 2022). Although the Ryzen 7 5700G performs better in the multi-core performance compared to the Ryzen 5 5600X, the higher price tag would push us over budget, thus limiting the overall quality as we would need to cut costs in other components.

For our second option, we found that the Intel i5-12400F was a solid second choice as it performs slightly higher and is only slightly more expensive than the 5 5600X.

We chose the Radeon RX 6600-XT for both builds as it placed second in performance, and was the second cheapest out of the GPUs assessed.

Because the other components have less significance compared to the CPU and GPU, picked based on their strong performance and competitive price.

**AMD build:**

CPU: Ryzen 5 5600X - $210

Mobo: MSI B550M PRO-VDH WIFI - $155

RAM: Corsair Vengeance LPX 16 GB (2 x 8 GB) DDR4-3200 CL16 - $75

Storage 1: Seagate Barracuda Compute 2TB 3.5" 7200RPM - $69

Storage 2: Samsung 980 500GB NVMe SSD - $67

GPU: PowerColor AMD Radeon 6600 XT - $330

Case: SilverStone SST-PS15B mATX Case - $80

PSU: EVGA SuperNOVA 650 G3 80+ Gold FUll Modular - $155

OS: Windows 10 Home OEM Key: - $100

Peripherals: Razer Bundle(KB, Mouse, Headset) - $100

Monitor: Optix G242P 23.8in Full HD 144Hz - $180

Mouse pad/mat: SteelSeries QCK Large: - $20

Final Price Before tax:1541

Final Price After tax: 1725.92

**Intel build:**

CPU: i5-12400F $265

Mobo: MSI MAG B660M BAZOOKA DDR4 Micro ATX - $210

RAM: Corsair Vengeance LPX 16 GB (2 x 8 GB) DDR4-3200 CL16 - $75

Storage 1: Seagate Barracuda Compute 2TB 3.5" 7200RPM - $69

Storage 2: Samsung 980 500GB NVMe SSD - $67

GPU: PowerColor AMD Radeon 6600 XT - $330

PSU: EVGA SuperNOVA 650 G3 80+ Gold FUll Modular - $155

OS: Windows 10 Home OEM Key: - $100

Peripherals: Razer Bundle(KB, Mouse, Headset) - $100

Monitor: Optix G242P 23.8in Full HD 144Hz - $180

Mouse pad/mat: SteelSeries QCK Large: - $20

Final price before tax: $1571

Final Price after tax: $1759.52

**Future-Proofing**

The parts that we have picked out for both builds are designed for enough longevity to last five years at the bare minimum, depending on how demanding future games will be and on the interests of the students. The selected components for our PC builds provide fantastic performance for the current popular games, which should stay valid for at least the next couple of years. With the consumer market for computer parts improving while having new releases every year, the validity of future-proofing is definitely a point of concern.

There are valid concerns about future-proofing regarding the hardware of our PCs, but we have taken advantage of the generational transition between components this year. The CPU we selected for our AMD build was the last of AMD's AM4 socket platform, which means that future-generation AMD CPUs will be coming in a different shape. This choice means that we will not have any forwards-compatibility with the CPU, and a new motherboard would have to be purchased if an upgrade is needed. With our Intel-based PC, we do have better forward compatibility headroom with our motherboard. The Intel build's motherboard supports the LGA1700 socket type, which has been in circulation since November 2021. This motherboard is slated to be viable with Intel's 12th-generation CPUs released in 2021 and 13th-generation CPUs released in 2022. When it becomes time for the CPUs to be upgraded, the parts supporting new sockets and other technologies will be much cheaper to access due to the time the new products have had to saturate the market, lowering the costs for the previous generation components.

While deciding on the components for our builds, we wanted to keep the longevity of the parts in mind so that the students would not need to replace individual parts on their own and bear the burden of the cost. Many of the selected components have a fantastic warranty period for hardware malfunctions, with a minimum period of 12 months (Figure: Product Warranty Periods).

Chart, bar chart

Description automatically generated

Graph contents courtesy of newegg.com

The graph above clearly states how the warranty period for the selected components will protect the students in the case of needing any replacements. The Windows key is provided as a one-time-use code, so there is no need for a warranty on the Windows key after it's registered to the computer.

**Conclusion**

Both computer builds have excellent performance while staying under budget. Because their performance is essentially the same, we settled for the Ryzen Build as our main option for its cheaper price. The Ryzen build will be the computer provided for the grateful students.

**Recommendation**

Our first step would be to source the parts. These will be purchased through the Canadian computer parts provider canadacomputers.com. A bulk discount is yet to be determined, but installation for each computer will cost $60 (Canada Computers & Electronics, 2022). We will work closely with Canada Computers & Electronics to get these powerful computers into the hands of the students.

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